WHAT IS CLAIMED IS:

1. An optical transmission system, used for radio access for transmitting information between a center station and a subscriber terminal through a radio base station for transmitting and receiving a radio signal to and from an antenna portion, for optically transmitting radio signals bidirectionally by respectively connecting a plurality of radio base stations covering different service areas and the center station through a plurality of optical fibers, wherein

said center station comprises at least

an electrical-optical conversion portion, receiving one or more baseband signals as one or more modulated electric signals each having a predetermined intermediate frequency, for converting the electric signals into optical signals by intensity modulation,

a local oscillation signal source for outputting a predetermined local oscillation signal,

an external modulation portion for intensity-modulating the optical signal obtained by the conversion in said electrical-optical conversion portion using the local oscillation signal outputted from said local oscillation signal source, and

an optical branching portion for branching the optical signal intensity-modulated by said external modulation portion, and respectively outputting optical signals obtained by the branching to the plurality of optical fibers, and

each of said plurality of radio base stations comprises at least

an optical-electrical conversion portion for converting the optical signal transmitted through said optical fiber into an electric signal in a radio frequency band, and

a band pass filter for extracting only an electric signal component in a desired frequency band from the electric signal obtained by the conversion in said optical-electrical conversion portion, and feeding the extracted electric signal component to said antenna portion.

2. An optical transmission system, used for radio access for transmitting information between a center station and a subscriber terminal through a radio base station for transmitting and receiving a radio signal to and from an antenna portion, for optically transmitting radio signals bidirectionally by respectively connecting a plurality of radio base stations covering different service areas and the center station through a plurality of optical fibers, wherein

said center station comprises at least

a light source for outputting predetermined light,

a local oscillation signal source for outputting a predetermined local oscillation signal,

an external modulation portion for intensity-modulating the light outputted from said light source using the local oscillation signal outputted from said local oscillation signal source,

an optical branching portion for branching an optical signal obtained by the intensity modulation in said external modulation portion into optical signals whose number corresponds to the number of said plurality of radio base stations, and

a plurality of IF modulation portions, receiving one or more modulated electric signals each having a predetermined intermediate frequency by one or more baseband signals for each of said radio base stations to which the electric signal is to be transmitted, for respectively intensity-modulating the optical signals obtained by the branching in said optical branching portion using the electric signals, and respectively outputting the modulated optical signals to the plurality of optical fibers, and

each of said plurality of radio base stations comprises at least an optical-electrical conversion portion for converting the optical signal transmitted through said optical fiber into an electric signal in a radio frequency band, and feeding the electric signal to said antenna portion.

3. An optical transmission system, used for radio access for transmitting information between a center station and a subscriber terminal through a radio base station for transmitting and receiving a radio signal to and from an antenna portion, for optically transmitting radio signals bidirectionally by respectively connecting a plurality of radio base stations covering different service areas and the center station through a plurality of optical

fibers, wherein

said center station comprises at least

an electrical-optical conversion portion, one or more modulated electric signals each having a predetermined intermediate frequency by receiving one or more baseband signals for converting the electric signals into optical signals by intensity modulation,

a local oscillation signal source for outputting a predetermined local oscillation signal,

a first external modulation portion for intensity-modulating the optical signal obtained by the conversion in said electrical-optical conversion portion using the local oscillation signal outputted from said local oscillation signal source,

a first optical branching portion for branching the optical signal intensity-modulated by said first external modulation portion, and respectively outputting optical signals obtained by the branching to a plurality of downstream optical fibers,

a plurality of first optical-electrical conversion portions for respectively converting the optical signals transmitted from said plurality of radio base stations through a plurality of upstream optical fibers into electric signals in intermediate frequency bands, and

a plurality of demodulation portions for respectively demodulating the electric signals obtained by the conversion in said plurality of first optical-electrical conversion portions to the baseband signals, and

each of said plurality of radio base stations comprises at least

a second optical branching portion for branching the optical signal transmitted through said downstream optical fiber into two optical signals,

a second optical-electrical conversion portion for converting one of the optical signals obtained by the branching in said second optical branching portion into an electric signal in a radio frequency band,

a band pass filter for extracting only an electric signal component in a desired frequency band from the electric signal obtained by the conversion in said second optical-electrical conversion portion,

a circulator portion for outputting the electric signal component extracted by said band pass filter and the radio signal received by said antenna portion, respectively, to said antenna portion and a second external modulation portion, and

said second external modulation portion for intensity-modulating the other optical signal obtained by the branching in said second optical branching portion using the radio signal outputted from said circulator portion, and outputting the intensity-modulated optical signal to said upstream optical fiber.

4. An optical transmission system, used for radio access for transmitting information between a center station and a subscriber terminal through a radio base station for transmitting

and receiving a radio signal to and from an antenna portion, for optically transmitting radio signals bidirectionally by respectively connecting a plurality of radio base stations covering different service areas and the center station through a plurality of optical fibers, wherein

said center station comprises at least

a light source for outputting predetermined light,

a local oscillation signal source for outputting a predetermined local oscillation signal,

a first external modulation portion for intensity-modulating the light outputted from said light source using the local oscillation signal outputted from said local oscillation signal source,

a first optical branching portion for branching an optical signal obtained by the intensity modulation in said first external modulation portion into optical signals whose number corresponds to the number of said plurality of radio base stations, and

a plurality of IF modulation portions, receiving one or more modulated electric signals each having a predetermined intermediate frequency by one or more baseband signals for each of said radio base stations to which the electric signal is to be transmitted, for respectively intensity-modulating the optical signals obtained by the branching in said first optical branching portion using the electric signals, and respectively

outputting the modulated optical signals to the plurality of downstream optical fibers,

a plurality of first optical-electrical conversion portions for respectively converting the optical signals transmitted from said plurality of radio base stations through a plurality of upstream optical fibers into electric signals in intermediate frequency bands, and

a plurality of demodulation portions for respectively demodulating the electric signals obtained by the conversion in said plurality of first optical-electrical conversion portions to the baseband signals, and

each of said plurality of radio base stations comprises

a second optical branching portion for branching the optical signal transmitted through said downstream optical fiber into two optical signals,

a second optical-electrical conversion portion for converting one of the optical signals obtained by the branching in said second optical branching portion into an electric signal in a radio frequency band,

a circulator portion for outputting the electric signal obtained by the conversion in said second optical-electrical conversion portion and the radio signal received by the said antenna portion, respectively, to said antenna portion and a second external modulation portion, and

said second external modulation portion for

intensity-modulating the other optical signal obtained by the branching in said second optical branching portion using the radio signal outputted from said circulator portion, and outputting the intensity-modulated optical signal to said upstream optical fiber.

5. The optical transmission system according to claim 3, wherein

a downstream system through which the optical signal is transmitted by radio from said radio base station to said subscriber terminal and an upstream through which the optical signal is transmitting by radio from said subscriber terminal to said radio base station are made to differ in a radio frequency to be used.

6. The optical transmission system according to claim 1, wherein

the frequencies of the radio signals respectively used in said radio base stations are set so as to differ.

7. The optical transmission system according to claim 2, wherein

the frequencies of the radio signals used in said radio base stations which cover the adjacent service areas are set to differ from each other.

8. The optical transmission system according to claim 1, wherein

the optical signal outputted from said external modulation portion is an optical single-sideband signal with a carrier and a single-sideband component.

9. The optical transmission system according to claim 1, wherein

a Mach-Zehnder type external modulator is used for said external modulation portion, and a bias point in the external modulator is set to a point at which light output power is the minimum or maximum so that the optical signal is intensity-modulated by a component which is twice the frequency of said local oscillation signal.

10. The optical transmission system according to claim 1, wherein

a semiconductor laser for converting an electric signal into an optical signal through direct modulation is used for said electrical-optical conversion portion.

11. The optical transmission system according to claim 10, wherein

an optical fiber in which the wavelength of the optical signal outputted from said electrical-optical conversion portion

and the zero dispersion wavelength almost coincide with each other is used for said optical fiber.

12. An optical transmission system, used for radio access for transmitting information between a center station and a subscriber terminal through a radio base station for transmitting and receiving a radio signal to and from an antenna portion, for optically transmitting radio signals bidirectionally by respectively connecting first to n-th (n is an integer of not less than two) radio base stations covering different service areas and the center station through first to n-th upstream and downstream optical fibers respectively provided so as to correspond to the radio base stations, wherein

said center station comprises

first to n-th electrical-optical conversion portions for respectively converting one or more signals each having a predetermined intermediate frequency into first to n-th optical signals having different wavelengths λ d1 to λ dn uniquely corresponding to said first to n-th radio base stations,

a wavelength multiplexing portion for multiplexing said first to n-th optical signals obtained by the conversion,

a local oscillation signal source for outputting a local oscillation signal having a predetermined frequency,

an optical modulation portion for intensity-modulating the multiplexed optical signals outputted from said wavelength

multiplexing portion using said local oscillation signal, and

a wavelength separation portion for wavelength-separating the multiplexed optical signals intensity-modulated into first to n-th modulated optical signals having wavelengths λd1 to λdn, and sending out the k-th (k = 1 to n) modulated optical signal to said k-th downstream optical fiber, and

said k-th radio base station comprises an optical-electrical conversion portion, receiving said k-th modulated optical signal having the wavelength λdk transmitted through said k-th downstream optical fiber, for converting the modulated optical signal into an electric signal in a radio frequency band, and outputting the electric signal.

13. An optical transmission system, used for radio access for transmitting information between a center station and a subscriber terminal through a radio base station for transmitting and receiving a radio signal to and from an antenna portion, for optically transmitting radio signals bidirectionally by respectively connecting first to n-th (n is an integer of not less than two) radio base stations covering different service areas and the center station through first to n-th upstream and downstream optical fibers respectively provided so as to correspond to the radio base stations, wherein

said center station comprises

first to n-th electrical-optical conversion portions

for respectively converting one or more signals each having a predetermined intermediate frequency into first to n-th downstream optical signals having different wavelengths $\lambda d1$ to λdn uniquely corresponding to said first to n-th radio base stations,

first to n-th upstream light sources respectively outputting first to n-th upstream optical signals having wavelengths $\lambda u1$ to λun which differ from any of the wavelengths $\lambda d1$ to λdn and differ from one another,

a wavelength multiplexing portion for multiplexing said first to n-th downstream optical signals obtained by the conversion and said outputted first to n-th upstream optical signals,

a local oscillation signal source for outputting a local oscillation signal having a predetermined frequency,

an optical modulation portion for intensity-modulating the multiplexed optical signals outputted from said wavelength multiplexing portion using said local oscillation signal,

a wavelength separation portion for wavelength-separating said multiplexed optical signals intensity-modulated to the first to n-th modulated downstream optical signals having the wavelengths $\lambda d1$ to λdn and the first to n-th modulated upstream optical signals having the wavelengths $\lambda u1$ to λun, and sending out the k-th (k = 1 to n) modulated downstream optical signal, together with the k-th modulated upstream optical signal,

to said k-th downstream optical fiber, and

first to n-th optical-electrical conversion portions for respectively converting the optical signals transmitted through said first to n-th upstream optical fibers into electric signals, and

said k-th radio base station comprises

a two-wavelength separation portion, receiving the optical signal transmitted through said k-th downstream optical fiber, for separating the optical signal into said k-th modulated downstream optical signal having the wavelength λdk and said k-th modulated upstream optical signal having the wavelength λuk,

an optical-electrical conversion portion for converting the k-th modulated downstream optical signal obtained by the separation in said two-wavelength separation portion into an electric signal and outputting the electric signal, and

an RF modulation portion for intensity-modulating the k-th modulated upstream optical signal obtained by the separation in said two-wavelength separation portion using the inputted radio signal, and sending out the k-th modulated upstream optical signal intensity-modulated to said k-th upstream optical fiber.

14. The optical transmission system according to claim 13, wherein

the wavelengths $\lambda d1$ to λdn of said first to n-th downstream optical signals are set so as to belong to a predetermined first

wavelength band,

the wavelengths $\lambda u1$ to λun of said first to n-th upstream optical signals are set so as to belong to a predetermined second wavelength band,

said two-wavelength separation portion in said k-th radio base station wavelength-separates the optical signal transmitted through said k-th downstream optical fiber into an optical signal in said first wavelength band and an optical signal in said second wavelength band, to separate the optical signal into said k-th modulated downstream optical signal having the wavelength λdk and said k-th modulated upstream optical signal having the wavelength λuk.

15. An optical transmission system, used for radio access for transmitting information between a center station and a subscriber terminal through a radio base station for transmitting and receiving a radio signal to and from an antenna portion, for optically transmitting radio signals bidirectionally by respectively connecting first to n-th (n is an integer of not less than two) radio base stations covering different service areas and the center station through first to n-th upstream and downstream optical fibers respectively provided so as to correspond to the radio base stations,

said center station comprises

first to n-th electrical-optical conversion portions for respectively converting one or more signals each having a

predetermined intermediate frequency into first to n-th downstream optical signals having different wavelengths λd1 to λdn belonging to a predetermined first wavelength band uniquely corresponding to said first to n-th radio base stations,

first to n-th upstream light sources respectively outputting first to n-th upstream optical signals having wavelengths λu1 to λun which differ from any of the wavelengths λd1 to λdn and belong to a predetermined second wavelength band,

a wavelength multiplexing portion for multiplexing said first to n-th downstream optical signals obtained by the conversion and said outputted first to n-th upstream optical signals,

a local oscillation signal source for outputting a local oscillation signal having a predetermined frequency,

an optical modulation portion for intensity-modulating the multiplexed optical signals outputted from said wavelength multiplexing portion using said local oscillation signal,

a wavelength separation portion for wavelength-separating said multiplexed optical signals intensity-modulated to first to n-th modulated downstream optical signals having the wavelengths λd1 to λdn and the first to n-th modulated upstream optical signals having the wavelengths λu1 to λun, and sending out the k-th (k = 1 to n) modulated downstream optical signal, together with the k-th modulated upstream optical signal, to said k-th downstream optical fiber, and

first to n-th optical-electrical conversion portions for respectively converting the optical signals transmitted through said first to n-th upstream optical fibers into electric signals, and

said k-th radio base station comprises an electro-absorption type modulation portion, receiving the optical signal transmitted through said k-th downstream optical fiber to separate the optical signal into the k-th modulated downstream optical signal having the wavelength λdk and said k-th modulated upstream optical signal having the wavelength λuk, converting said k-th modulated downstream optical signal in said first wavelength band representing an optical-electrical conversion function into an electric signal and outputting the electric signal, and intensity-modulating said k-th modulated upstream optical signal in said second wavelength band representing an electrical-optical conversion function using the inputted radio signal and sending out said k-th modulated upstream optical signal intensity-modulated to said k-th upstream optical fiber.

16. The optical transmission system according to claim 13, wherein

said first to n-th upstream light sources respectively output said first to n-th upstream optical signals which uniquely correspond to said first to n-th downstream optical signals and have wavelengths λu1 to λun respectively different from the wavelengths λd1 to λdn

of the first to n-th downward optical signals by predetermined amounts fs.

17. A high frequency optical transmitter used in a center station, connected to a plurality of radio base stations respectively covering different service areas using a plurality of optical fibers, for optically transmitting radio signals, comprising

a three-branching portion for branching an inputted electric signal into first and second electric signals which are the same in phase and a third electric signal which has a phase difference of 90° from the first and second electric signals;

an electrical-optical conversion portion for converting said third electric signal into a light intensity modulated signal;

a first delay control portion for adjusting the propagation time of said first electric signal;

a second delay control portion for adjusting the propagation time of said second electric signal;

a two-branching portion for branching an inputted local oscillation signal into first and second local oscillation signals which are opposite in phase;

a third delay control portion for adjusting the propagation time of said first local oscillation signal;

a fourth delay control portion for adjusting the

propagation time of said second local oscillation signal;

a first multiplexing portion for multiplexing said first electric signal outputted from said first delay control portion and said first local oscillation signal outputted from said third delay control portion;

a second multiplexing portion for multiplexing said second electric signal outputted from said second delay control portion and said second local oscillation signal outputted from said fourth delay control portion; and

a differential intensity modulator, having first and second electrodes, for modulating said light-intensity modulated signal outputted from said electrical-optical conversion portion by respectively inputting signals obtained by the multiplexing in said first and second multiplexing portions to said first and second electrodes,

said first to fourth delay control portions being adjusted such that said first and second electric signals inputted to said first and second electrodes of said differential intensity modulator through said first and second multiplexing portions are the same in phase, to subject the optical signal outputted from said electrical-optical conversion portion to phase modulation and subject the optical signal to optical modulation which is the same in amount as and is opposite in phase to the frequency deviation (an FM index) of a light frequency modulation component of the optical signal.

18. A high frequency optical transmitter used in a center station, connected to a plurality of radio base stations respectively covering different service areas using a plurality of optical fibers, for optically transmitting radio signals, comprising

a three-branching portion for branching an inputted electric signal into first and second electric signals which are the same in phase and a third electric signal which has a phase difference of 90° from the first and second electric signals;

an electrical-optical conversion portion for converting said third electric signal into a light intensity modulated signal;

a first delay control portion for adjusting the propagation time of said first electric signal;

a second delay control portion for adjusting the propagation time of said second electric signal;

a two-branching portion for branching an inputted local oscillation signal into first and second local oscillation signals which have a difference of 90° to each other;

a third delay control portion for adjusting the propagation time of said first local oscillation signal;

a fourth delay control portion for adjusting the propagation time of said second local oscillation signal;

a first multiplexing portion for multiplexing said first electric signal outputted from said first delay control portion and said first local oscillation signal outputted from said third delay control portion;

a second multiplexing portion for multiplexing said second electric signal outputted from said second delay control portion and said second local oscillation signal outputted from said fourth delay control portion; and

a differential intensity modulator, having first and second electrodes, for modulating said light intensity modulated signal outputted from said electrical-optical conversion portion by respectively inputting signals obtained by the multiplexing in said first and second multiplexing portions to said first and second electrodes,

said first and second delay control portions being adjusted such that a phase difference between said first and second electric signals inputted to said first and second electrodes of said differential intensity modulator through said first and second multiplexing portions is zero, to subject the optical signal outputted from said electrical-optical conversion portion to phase modulation and subject the optical signal to optical modulation which is the same in amount as and is opposite in phase to the frequency deviation of a light frequency modulation component of the optical signal,

said third and fourth delay control portions being adjusted such that said first and second local oscillation signals inputted to said first and second electrodes of said differential intensity modulator through said first and second multiplexing portions have a difference of 90° to each other, to subject said optical signal

to optical side-band modulation with a light carrier.

19. A high frequency optical transmitter used in a center station, connected to a plurality of radio base stations respectively covering different service areas using a plurality of optical fibers, for optically transmitting radio signals, comprising:

a two-branching portion for branching an inputted electric signal into first and second electric signals which have a difference of 90° to each other;

an electrical-optical conversion portion for converting said first electric signal into a light intensity modulated signal;

a delay control portion for adjusting the propagation time of said second electric signal; and

an integrated modulation portion, comprising a phase modulation portion and an intensity modulation portion formed on the same substrate, for modulating said light intensity modulated signal outputted from said electrical-optical conversion portion by inputting said second electric signal outputted from said delay control portion to the phase modulation portion and inputting an inputted local oscillation signal to the intensity modulation portion,

in said phase modulation portion, the optical signal outputted from said electrical-optical conversion portion being subjected to phase modulation and subjected to optical modulation which is opposite in phase to the frequency deviation of a light frequency

modulation component of the optical signal.